

Serial No. 10/629,614

Amendment dated December 9, 2005

Atty. Docket No. 277/006

Reply to Office action of September 9, 2005

REMARKS

Prior to entry of this amendment, claims 1-64 are currently pending in the subject application. Claims 2-16 and 32-64 have been canceled. Claims 1 and 17-31 have been amended. Claim 1 is the sole independent claim.

Applicants appreciate the Examiner's acknowledgement of applicants' claim for foreign priority and receipt of a certified copy of the priority document.

Applicants appreciate the Examiner's consideration of the Information Disclosure Statement, filed on June 20, 2005.

Claims 1 and 2-31 are presented to the Examiner for further prosecution on the merits.

A. Introduction

In the outstanding Office action, the Examiner rejected claims 1, 2, 5, and 6 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Publication No. 2003/0169037 to Kang et al. ("the Kang reference"), rejected claims 1-5, 7-9, 17-20, 22, and 23 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,690,164 to Fedeli et al., embodiment one ("FE1"), in view of Fedeli et al., embodiment two ("FE2") and U.S. Patent No. 6,251,834 to Glowacki ("the Glowacki reference"), rejected claims 6, 9, 10-16, 21, and 24-31 under 35 U.S.C. §103(a) as being unpatentable over FE1 in view of FE2 and the Glowacki et al. reference and in further view of U.S. Patent No. 6,411,086 to Choi ("the Choi reference") and U.S. Patent No. 6,100,694 to Wong ("the Wong reference").

B. Election of Claims 1-31

Applicants confirm the election of claims 1-31 without traverse. Claims 32-64 have been cancelled without prejudice. Applicants reserve the right to file continuing and/or divisional applications to prosecute the non-elected subject matter.

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The Examiner has objected to the drawings as failing to comply with 37 C.F.R. §1.83(a). Specifically, the Examiner stated that the limitation "external circuit" must be shown in the drawings or cancelled from claim(s).

Responsive to the objection, applicants have amended claim 1 accordingly. Specifically, the limitation "external circuit" has been cancelled. Therefore, applicants contend that drawings as they are presented now fully satisfy the requirements of 37 C.F.R. §1.83(a). As such, applicants respectfully request the objections to the drawings be withdrawn.

D. Objections to Claims1. Claim 1

The Examiner has objected to claim 1 due to the following informalities: the phrase "a pad for establishing conductivity between the first and second excitation coils and the first and second pick-up coils and an external circuit" is unclear.

In response, applicants have amended claim 1. Specifically, the abovementioned phrase has been cancelled. As such, the applicants respectfully request the objection to claim 1 be withdrawn.

2. Claims 2-31

The Examiner has objected to claims 2-31 as containing unclear limitations. Applicants have canceled claims 2-16 and have amended remaining claims 17-31 accordingly. Applicants submit that no new matter has been entered and the scope of claims 2-31 remains unchanged. As such, applicants respectfully request the objections to claims 2-31 be withdrawn.

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In the outstanding Office action, the Examiner rejected claims 1, 2, 5, and 6 under 35 U.S.C. §102(e) as being anticipated by the Kang reference. This rejection is respectfully traversed for at least the reasons set forth below.

Applicants have amended claim 1 to more clearly recite aspects of the present invention. Support for the amendment can be found, for example, in the Specification at paragraph [0033] and FIGS. 4A-4L. Independent claim 1, as amended, recites limitations not taught, shown or suggested by the Kang reference. In particular, claim 1 has been amended to recite, in part, that the first and second soft magnetic cores form a "rectangular ring." It is respectfully submitted that the Kang reference merely discloses, at most, magnetic cores formed as two bars.

It is respectfully submitted that this claimed structure is also not obvious over the two bars of the Kang reference. When the soft magnetic cores are formed as rectangular rings, as now recited in claim 1, influence of the leakage flux due to the closed-magnetic path is decreased as compared with that of the two bar structure. This allows the rectangular ring to better detect certain types of magnetism, e.g., terrestrial magnetism. This is neither taught nor suggested by the Kang reference.

Thus, applicants submit that claim 1 is patentable over the Kang reference. Claims 2, 5 and 6 have been canceled, thereby obviating this rejection. Therefore, it is respectfully requested that the rejection be withdrawn.

F. Asserted Obviousness Rejection of Claims 1-5, 7-9, 17-20, 22, and 23

In the outstanding Office action, the Examiner rejected claims 1-5, 7-9, 17-20, 22 and 23 under 35 U.S.C. §103(a) as being unpatentable over FE1 in view of FE2 and the Glowacki reference. This rejection is respectfully traversed for at least the reasons set forth below.

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Applicants have amended claims 1 and 17-20, 22, and 23 to more clearly recite aspects of the invention. Independent claim 1, as amended, recites limitations not taught, shown, or suggested by a combination of FE1, FE2 and the Glowacki reference.

FE1 and FE2 teach a single-axis fluxgate micro-magnetometer (i.e., fluxgate sensor) having a double excitation coil 12 and a pick-up coil 14, which are wound on ferromagnetic bars 10a and 10b (col. 1, line 66 - col. 2, line 6; FIG. 1A). The sensor is disposed on a substrate 16 and, apparently, is fabricated using techniques not compatible with PCB-based technologies (FIG. 1B).

The Glowacki reference teaches a substrate for growing layers of oxide superconductive materials for high-current applications (Abstract).

However, none of the alleged references, alone or in a combination, teaches, shows, or suggests a PCB integrated with a two-axis fluxgate sensor formed on that single PCB, as recited in claim 1. Specifically, the alleged references do not teach the PCB comprising a single dielectric core and where the first excitation coil, the first pick-up coil, and the first soft magnetic core are disposed on a first side of the (single) PCB and the second excitation coil, the second pick-up coil, and the second soft magnetic core are disposed on a second side of the same PCB, as recited in claim 1. Further, the excitation coil and the pick-up coil in the FE1 are wound around different parts of the core, while, as recited in claim 1, the excitation and pick-up coils are alternatively wound around the corresponding core. Finally, the FE1 depict a core disposed perpendicular to the substrate, rather than the parallel structure recited in the wherein clause of claim 1.

Moreover, FE2 and the Glowacki reference cannot be utilized to modify the teachings of FE1 in a manner that would result in the applicants' PCB integrated with a two-axis fluxgate

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sensor recited in claim 1. As such, a combination of FE1, FE2 and the Glowacki reference would not produce applicants' invention of claim 1.

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 USPQ 1021, 1024 (Fed. Cir. 1984) (emphasis added). Moreover, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem it solves. In re Wright, 6 USPQ 2d 1959, 1961 (Fed. Cir. 1988) (emphasis added). For at least the reasons discussed above, the alleged references fail to teach applicants' invention recited in claim 1 as a whole.

Furthermore, claims 17-20, 22 and 23 depend, either directly or indirectly, from claim 1 and recite additional features therefor. Since a combination of the alleged references would not produce applicants' invention recited in claim 1, dependent claims 2-5, 7-9, 17-20, 22, and 23 are also not obvious and are allowable.

As such, applicants submit that claims 1, 17-20, 22, and 23 are patentable over FE1 in view of FE2 and the Glowacki reference. Therefore, applicants respectfully request the rejection be withdrawn.

G. Asserted Obviousness Rejection of Claims 6, 9, 10-16, 21, and 24-31

In the outstanding Office action, the Examiner rejected claims 6, 9, 10-16, 21, and 24-31 under 35 U.S.C. §103(a) as being unpatentable over FE1 in view of FE2 and the Glowacki et al. reference and in further view of the Choi reference and the Wong reference. Claims 6 and 9-16 have been canceled, thereby obviating this rejection. For the remaining claims, this rejection is respectfully traversed for at least the reasons set forth below.

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Applicants have amended claim 1, from which claims 21, and 24-31 depend, and amended claims 6, 9, 10-16, 21, and 24-31 to more clearly recite aspects of the invention.

Independent claim 1, as amended, recites limitations not taught, shown, or suggested by a combination of the alleged references. In particular, the patentability of claim 1 over FE1, FE2, and the Glowacki reference has been discussed above in Section F.

The Choi reference teaches a single-axis magnetic field sensing device (i.e., fluxgate sensor) having stacked magnetic cores ("bars") 12 and 13 (FIG. 2). The Choi reference therefore fails to disclose or suggest the soft magnetic cores on either side of the substrate, as now recited in claim 1, and instead teaches that these cores are stacked on each other on one surface of the substrate. Therefore, the Choi reference actually teaches away from applicants' invention.

The Wong reference teaches multiple-tune bird cage coils 40 for RF applications where a planar inductor (coil) 54 (i.e., 2D coil) is formed in a zigzag fashion (FIGS. 4-5). The Examiner's attention is directed to the fact that, in contrast with the Wong's reference, the term "zigzag" in the instant patent application refers to spatial excitation and pick-up coils (i.e., 3D coils). Therefore, teachings of the Wong reference are not applicable to the subject matter of applicants' invention, and, in particular, that the cores are stacked on either side of the substrate or perpendicularly to each other.

Furthermore, none of the alleged references, alone or in a combination, teaches, shows, or suggests a PCB integrated with a two-axis fluxgate sensor formed on that single PCB, as recited in claim 1. Specifically, the alleged references do not teach the PCB comprising a single dielectric core and where the first excitation coil, the first pick-up coil, and the first soft magnetic core are disposed on a first side of the (single) PCB and the second excitation coil, the second

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pick-up coil, and the second soft magnetic core are disposed on a second side of the same PCB, as recited in claim 1.

Moreover, FE2, the Glowacki reference, the Choi reference, and the Wong reference is not capable of being used to remedy the deficiencies of the teachings of FE1 in a manner that would result in the applicants' PCB integrated with a two-axis fluxgate sensor recited in claim 1. As such, a combination of FE1, FE2, the Glowacki reference, the Choi reference, and the Wong reference would not produce applicants' invention as claimed in claim 1. Therefore, applicants submit that claim 1 is patentable over the combination of the applied references.

Furthermore, claims 21, and 24-31 depend, either directly or indirectly, from claim 1 and recite additional features therefor. Since a combination of the alleged references would not produce applicants' invention as claimed in claim 1, dependent claims 21, and 24-31 are similarly also not obvious and are allowable.

As such, applicants submit that claims 6, 9, 10-16, 21, and 24-31 are patentable over FE1 in view of FE2, the Glowacki reference, the Choi reference, and the Wong reference. Therefore, applicants respectfully request the rejection be withdrawn.

H. Conclusion

Since the cited prior art references neither anticipate nor render obvious the subject invention as presently claimed, applicants respectfully submit that claims 1 and 17-31 are now in condition for allowance, and a notice to that effect is respectfully requested.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

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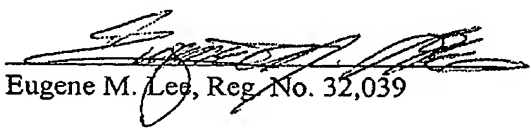
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In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

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Date: December 9, 2005


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PETITION and
DEPOSIT ACCOUNT CHARGE AUTHORIZATION

This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying papers may also be charged to Deposit Account No. 50-1645.

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. §1.8

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